

Workforce Solutions of Tennessee Local Workforce Development Area (LWDA) 6

2016 Labor Education Alignment Program (LEAP 2.0)

Advanced Robotics Training (ART) Program

Workforce Solutions of Tennessee LWDA 6

IN PARTNERSHIP WITH

1. Motlow State Community College
2. Warren County Schools, White County Schools, Cannon County Schools, DeKalb County Schools, Van Buren County Schools, Coffee County Schools, Grundy County Schools
3. Batesville Manufacturing, Inc. (Coffee Co.), Bridgestone Americas Tire Operations (Warren Co. & Rutherford Co.), Calsonic Kansei (Bedford Co.), Custom Tool (Putnam Co.), Federal Mogul (DeKalb Co. & White Co.), Great Lakes Cheese Co. Inc. (Coffee Co.), Kasai North America, Inc. (Coffee Co.), Morrison Industries (Warren Co.), Nissan North America (Franklin Co.), Shiroki North America, Inc. (DeKalb Co.), and Yorozu Automotive Tennessee (Warren Co.)

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Funding requested:

\$ 999,475




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July 26, 2016

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Advanced Robotics Training (ART) Program Abstract/Project Summary

The Advanced Robotics Training (ART) Program is a multi-regional, industry-driven program designed to equip residents of the service region with skills and training in advanced robotics so they may receive the necessary certification and college credentials to obtain quality, high-paying jobs in local industries. A collaboration between regional high schools, Motlow State Community College (MSCC), regional industries, and regional government and workforce development entities, the project will include robotics training in high school Career Technical Education programs, work-based learning opportunities for high school students at local industries, and the expansion of an Advanced Robotics degree program at MSCC-McMinnville.

The collaboration led by Motlow State Community College-McMinnville requests funding for the following advanced robotics equipment, curriculum and training to establish STEM-related courses in seven partnering high schools and MSCC-McMinnville.

Motlow- McMinnville Campus

• Four (4) Robotic Work Cells (2 Fanuc, 1 Motoman, 1 ABB)	\$219,600
• Ten (10) iPendant Simulation Stations	\$ 52,350
• Training for two (2) instructors	\$ 15,000
• Curriculum and instruction materials	<u>\$ 5,000</u>
Total for Motlow-McMinnville	\$291,950

Seven (7) participating high schools

• One (1) Robotic Work Cell (Fanuc, Motoman, or ABB)	\$ 54,900
• Five (5) iPendant Simulation Stations	\$ 26,175
• Training for two (2) instructors	\$ 15,000
• Curriculum and instruction materials	<u>\$ 5,000</u>
Total for each high school	\$101,075
Total for seven high schools	\$707,525

Total LEAP funds requested	\$999,475
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The LEAP collaboration includes 14 industry partners from 8 Tennessee counties. This program is completely industry-led and has been in progress for approximately two years. Partnering companies include Batesville Manufacturing, Inc. (Coffee Co.), Bridgestone Americas Tire Operations (Warren Co. and Rutherford Co.), Calsonic Kansei (Bedford Co.), Custom Tool (Putnam Co.), Federal Mogul (DeKalb Co. and White Co.), Great Lakes Cheese Co. Inc. (Coffee Co.), Kasai North America, Inc. (Coffee Co.), Morrison Industries (Warren Co.), Nissan North America (Franklin Co.), Shiroki North America, Inc. (DeKalb Co.), and Yorozu Automotive (Warren Co.), Viam Manufacturing, Inc. (Coffee Co.).

Proposal Advanced Robotics Training (ART) Project

Section 1. Demonstrated Need

Local industries have continually expressed a tremendous need for workers trained in mechatronics and robotics technology. The use of robots in local industry processes continues to increase as technology advances. With over 7,500 industrial robots currently in use within 75 miles of the Motlow State Community College (MSCC)-McMinnville campus, advanced robotics skills training is specifically needed by the rapidly evolving southeastern automotive industry. This robot population estimate is based on discussions with area users, as well as the three largest robot manufacturers – Yaskawa (Motoman), Fanuc, and ABB.

The Advanced Robotics Training (ART) project will address this pressing need in its service region and beyond to meet the industry demand for certified and skilled workers in advanced robotics. With LEAP funds, robotic equipment will be purchased for the purpose of training high school students, college students, and the existing workforce on this technology. Yorozu Automotive, the largest robot user in Tennessee, is currently operating 1,200 robots with more than 500 in reserve; this plant is located in Warren County, TN. Yorozu's Senior Manager of Engineering, Bruce Hutchins, stated in his attached letter of support, "It has always been difficult for us to hire new employees with robotic experience, and we feel that an ART program will address a strong need for our company, as well as other companies in the area. Currently, we are aggressively hiring new employees, and we could easily hire 20+ ART candidates if they were available today." The need for a trained workforce in mechatronics and robotics is widespread across the region and must be addressed immediately.

According to the Tennessee Department of Economic and Community Development, since January 2011, 77 manufacturing projects have been announced in MSCC's service region. These projects include 10,250 job commitments and an investment of \$1.94 billion. Many of these jobs are in the automotive sector or other areas that involve the use of robots and will be difficult to fill with the current lack of skilled employees across the state. The automotive sector provides good quality jobs with an average hourly wage of \$28.56 in the service region. This sector has seen a 92.5% increase in regional employment since 2010. (Source: EMSI)

Business Facilities magazine named Tennessee as the top state in automotive manufacturing strength in February 2015. Seven of the top 10 states are within a one-day drive of south central Tennessee. Strengthening and enhancing robotics training in this area is essential. According to the Tennessee Department of Economic and Community Development, in 2012, 905 automotive manufacturers and suppliers were located in Tennessee, and 115,939 Tennesseans were employed in automotive manufacturing jobs. Thirty-three percent of all manufacturing jobs in Tennessee support the automotive industry, and over thirty percent of the state's employment growth was related to the industry. The automotive industry depends upon robots in its work processes. Training instructors and making students aware of opportunities through this type of STEM education is vital for the automotive industry as a whole, as well as the numerous manufacturers in south central Tennessee.

The annual LEAP report from 2015 found on TNECD's website states that "a recent national skills gap report by the Manufacturing Institute and Deloitte⁷ forecasts 3.5 million manufacturing jobs will need to be filled in the next 10 years, of which only 1.5 million will

be filled. A shortage of STEM skills and a decline of technical education programs in high schools are among other contributing factors. The skills gap presents a shortage of 2 million workers over the next decade for the manufacturing sector alone." School systems across the nation have realized the tremendous error that was made in eliminating STEM and career technical courses in K-12 education. Tennessee counties are working to reverse these decisions and have placed an increasing priority on career technical and STEM education courses. This ART program will directly address the issue by providing seven high schools and MSCC- McMinnville with the necessary robotic equipment to educate students on the skills required in today's changing manufacturing environment.

Motlow State Community College and Warren County leadership have worked since the early 2000s to meet the growing needs of their local industrial landscape through a task force comprised of the local Business Roundtable Action Committee (BRAC), community college, TCAT, and secondary educators, the Industrial Development Board, and elected officials. Industry presented the need and the task-force stepped into action and developed the thriving mechatronics program in place today. In 2015 the local industry began to express a new and growing need for robotics training. The same group of individuals developed the Advanced Robotics Training (ART) task-force and have been methodically investigating the need for and feasibility of an enhancement of the already developed Mechatronics program offered at MSCC. This enhancement will involve the addition of advanced robotics training (ART). The three largest robot manufacturers have also worked with the task force to understand the scope and need of ART in the south central Tennessee region as well as throughout the southeastern United States.

To learn more about available resources for their local industries, task force members traveled to robotic training centers in Decatur, AL and Marion, OH. While programs offered at both centers are well implemented, neither met the training requests of the local industry partners. Currently, local industry must send employees to Dayton, OH, Chicago, IL, or Detroit, MI for training in advanced robotics. The development of robotics training in the MSCC-McMinnville service region will be invaluable to industry partners using robots.

On June 15, 2015, sixteen company executives from prominent robot users in the MSCC-McMinnville service region met with the newly formed Advanced Robotics Training (ART) task force. The executives unanimously asked that a training program be developed that would enhance mechatronics training with advanced robotics skills. The consensus was to develop the program quickly and of top quality. From this meeting the, proposed ART program was established; this program seeks to be brought to fruition with LEAP grant funds.

Section 2. Program Plan

LEAP funding will enable the development and implementation of an employer-driven career pathway to funnel skilled workers into high-demand manufacturing jobs. The Advanced Robotics Training (ART) project will build a STEM education pathway for traditional students, nontraditional students, and industry workers, providing the opportunity to earn robotics certifications in high school, which will ladder into additional certificate and associate degree programs. The project proposes a fully integrated Advanced Robotics curriculum for high school juniors and seniors, continuing into post-secondary studies and Associate degree opportunities at MSCC-McMinnville. This project will provide direct services to seven Tennessee counties by placing robotics training

equipment in seven high school Career Technical Education/ STEM programs and Motlow-McMinnville.

MSCC-McMinnville will purchase four (4) Robotic Work Cells and ten (10) iPendant simulation stations. MSCC will also receive funding for the training of two (2) instructors, as well as initial curriculum and instruction materials to support the development of the program. This equipment and training will bolster MSCC's current mechatronics program by allowing them to create a new robotics specialization, expanding their capacity to eventually offer an AAS degree in Advanced Robotics. MSCC has been through this process before when they developed the state's first mechatronics training program. By developing an Associate degree in mechatronics, MSCC began to meet industry needs; through a current partnership with Middle Tennessee State University (MTSU), students can carry their training out to completion by obtaining a Bachelor's degree in mechatronics from MTSU. Later MSCC expansion plans are to develop a mechatronics AAS degree with a concentration in robotics and, later, a robotics AAS degree.

Local school districts and MSCC, in partnership with local industries, will meet the demand for skilled workers by providing training, coursework, and Work-Based Learning (WBL) opportunities in robotics throughout the service region. This program will introduce high school juniors and seniors to robotics technology, giving them the opportunity to participate in co-ops and internships with local industries. For the ART project, each participating school district will place one (1) Robotic Work Cell and five (5) iPendant simulation stations in that school's Career Technical Education (CTE) facility. Schools will choose this robotic equipment from one of three top robotics companies: Fanuc, ABB, or Motoman (Yaskawa). Each school will also receive training for two

instructors, as well as curriculum and instruction materials to support the robotics program. The initial high school courses will be offered as non-credit toward college certification, but students will achieve a certificate of completion by MSCC. Students will also have the opportunity to test for certification directly from one of three robot manufacturers as an Operator. Students and employees may return at anytime to earn an additional level of training and ultimately an Associate's degree in advanced robotics when the degree is implemented at MSCC. Students beginning their training in high school will have an extraordinary advantage toward their future career in robotics. This program will truly provide a 'learn to earn' experience for its participants, equipping them with invaluable education credentials and career training toward a lifetime of success.

Many of the high schools in the service region have existing WBL programs in place; therefore, LEAP funds are not being requested to develop a WBL system. Local industries have committed to work with existing programs through the school systems and eventually hire credentialed students upon completion. The ultimate goal of the program is to provide individuals the skills needed to enter the workplace easily and quickly at each step along the pathway. The ART project will directly benefit participants by developing skills that can be readily disseminated into the workplace. It will also directly benefit the participating manufacturers by producing better-trained employees and filling broadening skill gaps.

Implementation of the ART program will allow the region to graduate an estimated 80 high school seniors per year with experience in advanced robotics; these graduates can immediately begin to fill the voids being felt by existing manufacturing companies. Additionally, MSCC expects to graduate 15-20 students per semester in the initial stages of

the project; this number is expected to increase annually once the concentration is implemented.

ART objectives align perfectly with the Governor's Drive to 55 initiative. The program will provide approximately 100 students per year with the opportunity to earn industry certifications from the three major robot manufacturers. Students completing the coursework and passing the certification test will increase the number of Tennesseans with a certificate and directly impact Drive to 55 results. Students who choose to further their studies and participate in the forthcoming Advanced Robotics Associate degree program will increase the state percentages of individuals with a degree. The program ultimately will increase the opportunities for post-secondary degree completion and quality, high-paying jobs for residents of rural Tennessee communities.

ART LEAP grant activities will be operational within one year of award. Meetings with participating school systems and key stakeholders will begin immediately upon grant approval. The process of purchasing equipment, including the bid process and equipment lead time, is approximately 150 days. A detailed step-by-step project time-line is included in Appendix A (ART Project Timeline). The equipment purchased through the LEAP grant will allow seven K-12 school districts and Motlow-McMinnville to begin offering courses in advanced robotics that will immediately begin a pipeline of skilled workers to meet the gaps of existing industry. Robotics courses are scheduled to begin in all seven high schools August 2017. MSCC plans to have all approvals and begin classes in August 2017 as well.

MSCC-McMinnville Dean of career & technical programs, Fred Rascoe, will serve as the project director and will lead the project steering committee that will maintain oversight throughout the project period and beyond. The steering committee will be made

up of the local Advanced Robotics Training (ART) Task Force that has been working to develop this program over the past two years, including MSCC staff, LWDA 6 director, CTE representatives, local industry representatives, and an Industrial Development Board representative.

A detailed explanation of measurable objectives for a student course in robotics may be found in Appendix B (STEM Standards-LEAP Outcomes). Regarding the Advanced Robotics curriculum to be created, the TN Dept. of Education STEM: Robotics & Automated Systems course provided the foundation for learning goals. Each state standard will be fully met and expanded upon through the new robotics curriculum MSCC will develop. The Tennessee Department of Education has developed a Robotics and Automated Systems program for high schools within the STEM career cluster. To date there are no dual credit or dual enrollment opportunities for students pursuing this career path at postsecondary institutions. A primary goal of this grant is to address this shortcoming by creating an articulation and dual credit opportunity for students to obtain college credit with the Robotics and Automated Systems program.

Section 3. Strength of Partnership

This industry-led project is the result of close collaboration between MSCC-McMinnville, industry partners, local school districts, local government entities and economic development agencies. A true multi-region approach, this project seeks to benefit each individual sector, as well as the region at large, by cultivating well-trained individuals and giving them the necessary tools to enter in-demand, competitive, high-paying jobs in their region.

Staff involved at MSCC include Melody Edmonds, Interim Vice President of Student Affairs and future Dean of the McMinnville Campus; Fred Rascoe, Project Director, Dean of Career and Technical Programs; Shane Buchanan, Director of Mechatronics and Mechatronics Instructor; Debra Smith, Assistant Dean Of Career and Technical Programs; and Ingrid Williams, Coordinator of Career and Technical Programs. MSCC is committing to create the robotics curriculum and start the state's first Advanced Robotics training program that provides an articulation path from the STEM program at the high school level to on-the-job work experience and community college certification.

The seven (7) participating school districts include Warren County Schools, Cannon County Schools, White County Schools, DeKalb County Schools, Van Buren County Schools, Coffee County Schools, and Grundy County Schools. Attached letters of commitment show each school district's support of the project and pledge to provide the facility for the equipment, educators to be trained, and sustain the program courses long-term.

Participating industries include Batesville Manufacturing, Inc. (Coffee Co.), Bridgestone Americas Tire Operations (Warren Co. and Rutherford Co.), Calsonic Kansei (Bedford Co.), Custom Tool (Putnam Co.), Federal Mogul (DeKalb Co. and White Co.), Great Lakes Cheese Co. Inc. (Coffee Co.), Kasai North America, Inc. (Coffee Co.), Morrison Industries (Warren Co.), Nissan North America (Franklin Co.), Shiroki North America, Inc. (DeKalb Co.), and Yorozu Automotive (Warren Co). Each supporting industry is committed to utilizing interns and/or co-op students participating in the program, working with their local high school's WBL program, and some companies have committed to employ MSCC graduates in Advanced Robotics in the future. Details on each company's participation and support can be found in the letters of support in Appendix C. The project also carries the

support of local government entities from each participating community, as well as other regional economic development partners.

The ART Task Force is comprised of the same individuals who responded to industry's call for help in 2008 when the mechatronics training program was developed. At MSCC alone, the enrollment has grown from a dozen students to over three hundred. The school has seen countless success stories of students entering the work-force in high-skilled, well-paid positions, as well as students who have continued their studies at MTSU and are graduating with a Bachelor's degree in mechatronics. The ART Task Force is well-equipped and strongly committed to seeing the proposed ART program to fruition.

Section 4. Budget Plan

All LEAP grant funds will be used to purchase equipment, train instructors, and purchase curriculum and materials that will directly support the education of high school juniors and seniors, college students, and the current workforce in Advanced Robotics.

LEAP funding will procure for Motlow State Community College:

- | | |
|---|-----------------|
| • four (4) Robotic Work Cells (2 Fanuc, 1 Motoman, 1 ABB) | \$ 219,600 |
| • ten (10) iPendant simulation stations | \$ 52,350 |
| • training of two (2) instructors | \$ 15,000 |
| • curriculum and instruction materials | <u>\$ 5,000</u> |

Total project cost for Motlow- McMinnville	\$ 291,950
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LEAP funding will procure the following for each of seven (7) participating high schools:

- | | |
|--|-----------|
| • One (1) Robotic Work Cell (Fanuc, Motoman, or ABB) | \$ 54,900 |
| • five (5) iPendant simulation stations | \$ 26,175 |
| • training of two (2) instructors | \$ 15,000 |

- curriculum and instruction materials \$ 5,000

Total project cost for seven high schools is \$ 707,525

LEAP funds requested equal \$999,475

Section 5. Sustainability

The LEAP grant will provide the initial robotic equipment, instructor training, and student curriculum materials to begin a mutually beneficial career preparation program for high schools, Motlow State Community College, and numerous local industries that utilize robotic equipment. The acquisition of initial robotic equipment for high school CTE programs adds a new level of education and training to participating students that can be used as long as the technology remains current. The acquisition of this equipment for MSCC will allow the college to expand their current course selection in mechatronics by creating a new robotics course allowing graduates to eventually earn an AAS degree in mechatronics with a specialization in Robotics, as well as the option of an AAS in Advanced Robotics after the funding period has ended. These new courses will be supported through the college's academic affairs division, and will allow students to learn and excel in robotics, which will prepare them more fully for exciting careers with substantial opportunities for growth. It will, of course, be very important for the ART program to keep current with advancements in technology and the needs of local companies in the Middle Tennessee region. Feedback from this program during the funding period will be vital in developing future workshops and courses for robotics.

MSCC-McMinnville will create direct partnerships with local manufacturing companies to train their current employees in advanced robotics. Several of the high schools have also committed to allow local industry to use their facilities and LEAP grant

equipment for advanced robotics training. Workshops and courses to be developed will include robotic training specific to each manufacturer, specific to the style of robot (material handling, welding, painting, etc.), as well as integration of robots into systems. The necessity and requirement for local advanced robotic training will be mandatory to support industrial maintenance and growth.

A steering committee will be established of the local Advanced Robotics Training (ART) Task Force, MSCC staff, LWDA 6 director, CTE representative, local industry representative, and an Industrial Development Board representative to monitor grant progress and ensure compliance with all policies and procedures. A full committee which consists of CTE directors and/or Director of Schools for each of the seven school systems, Motlow mechatronics/robotics department, directors from LWDA 6 and 7, development district representative, the ART task force and elected officials will meet as needed to answer questions, report progress and improve the program to the advantage of their students, workforce and local industry.

The proposed robotics equipment is a necessity to support the robotics activity and growth being experienced in the region. Numerous industries have met with the ART task-force and pleaded for robotics training. Drive to 55 goals will be achieved by providing students with the opportunity to learn, perfect and become certified in robotics at the high school or community college level. The proposed project will not be possible without Labor Education Alignment funding. Thank you for your time and consideration.

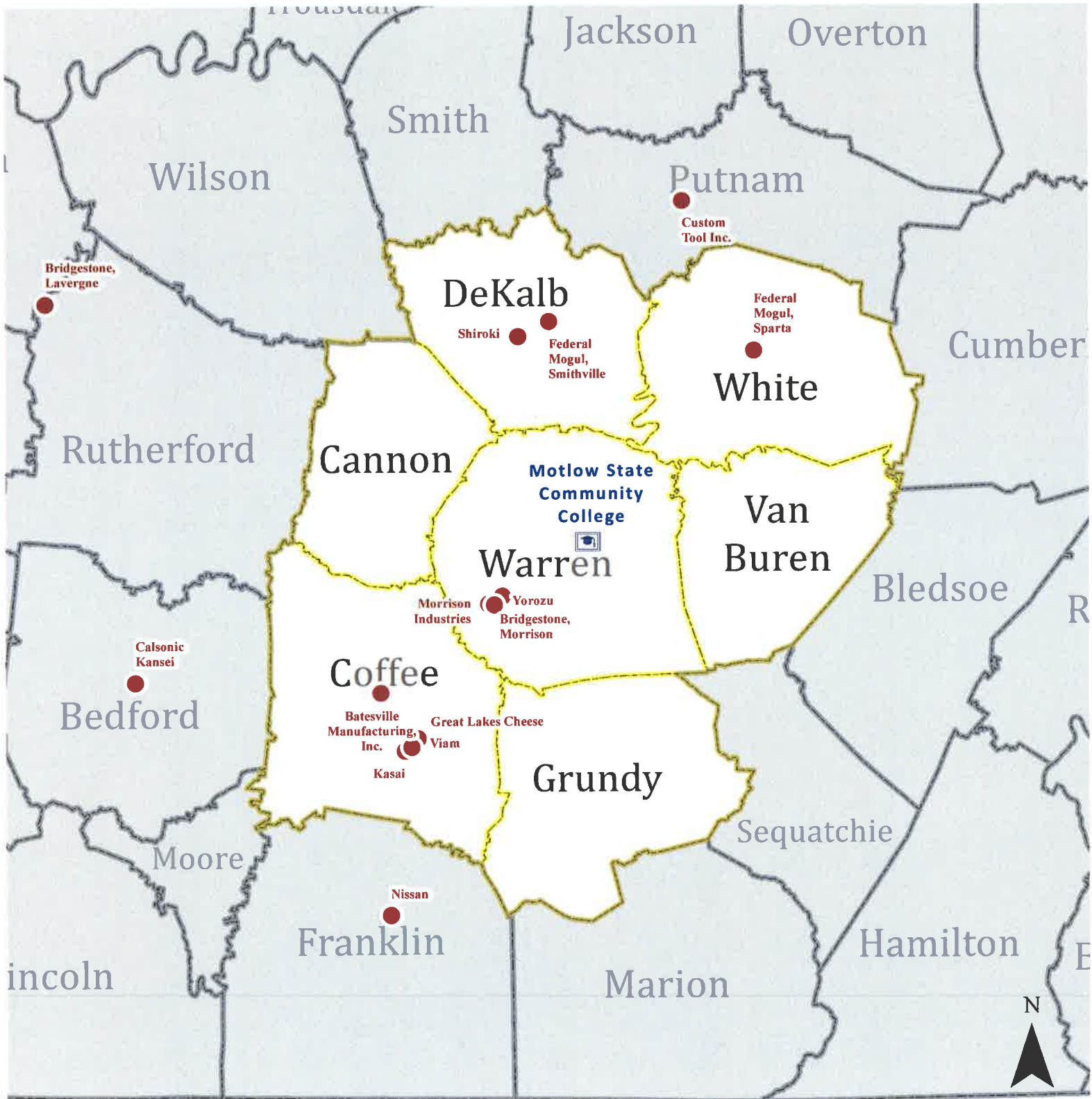
APPENDIX B- Budget

GRANT BUDGET				
LEAP Program Competitive Grant				
The grant budget line-item amounts below shall be applicable only to expenses incurred during the following				
Applicable Period: BEGIN: September 14, 2016 END: March 13, 2019				
POLICY 03 Object Line-item Reference	EXPENSE OBJECT LINE- ITEM CATEGORY ¹	GRANT CONTRACT	GRANTEE PARTICIPATIO N	TOTAL PROJEC T
1, 2	Salaries, Benefits & Taxes	0.00	0.00	0.00
4, 15	Professional Fee, Grant & Award ²	0.00	0.00	0.00
5, 6, 7, 8, 9, 10	Supplies, Telephone, Postage & Shipping, Occupancy, Equipment Rental & Maintenance, Printing & Publications	40,000	0.00	40,000
11, 12	Travel, Conferences & Meetings	120,000	0.00	120,000
18	Other Non-Personnel ²	0.00	0.00	0.00
20	Capital Purchase ²	839,475	0.00	839,475
22	Indirect Cost	0.00	0.00	0.00
24	In-Kind Expense	0.00	0.00	0.00
25	GRAND TOTAL	999,475	0.00	999,475

¹ Each expense object line-item shall be defined by the Department of Finance and Administration Policy 03, *Uniform Reporting Requirements and Cost Allocation Plans for Subrecipients of Federal and State Grant Monies, Appendix A*. (posted on the Internet at: www.state.tn.us/finance/act/documents/policy3.pdf).

² Applicable detail follows this page if line-item is funded.

ADVANCED ROBOTICS TRAINING



Information contained in this map was derived from US Census data and other sources. It is intended for illustrative purposes. The Upper Cumberland Development District does not warrant its use, timeliness or accuracy for surveying or engineering purposes.
J. Ballew/Daily

Appendix B: STEM Standards—LEAP Outcomes

Robotic operator training (LEAP) using STEM for student outcomes

TENNESSEE DEPARTMENT OF EDUCATION

STEM: Robotics & Automated Systems Course

Located: https://www.tn.gov/assets/entities/education/attachments/cte_std_robotics_automated_systems.pdf

Course Description: Robotics & Automated Systems is an applied course for students who wish to explore how robots and automated systems are used in industry. Building on the content and critical thinking frameworks of Principles of Engineering and Digital Electronics, this course asks students to follow the engineering design process and apply basic programming skills to complete assignments and projects. Upon completion of this course, proficient students will have an understanding of the historical and current uses of robots and automated systems; programmable circuits, interfacing both inputs and outputs; ethical standards for engineering and technology professions; and testing and maintenance of robots and automated systems. *Note: Standards in this course are presented sequentially for students' learning progression; however, instructors may tailor the order of course standards to their specifications. Students are expected to use engineering notebooks to document procedures, design ideas, and other notes for all projects throughout the course.*

STEM Standard		LEAP outcome (ART Project) MSCC-developed Advanced Robotics Course
Safety 1 Accurately read and interpret safety rules, including but not limited to rules published by the National Science Teachers Association (NSTA), rules pertaining to electrical safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements. Be able to distinguish between the rules and explain why certain rules apply. 2 Identify and explain the intended use of safety equipment available in the classroom. For example, demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment. (TN Reading 3, 4)		Safety 1 Accurately read and interpret safety rules, including but not limited to rules published by the National Science Teachers Association (NSTA), rules pertaining to electrical safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements. Be able to distinguish between the rules and explain why certain rules apply. 2 Identify and explain the intended use of safety equipment available in the classroom. For example, demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment. 3 Follow safety guidelines, and demonstrate the use of emergency stops, and servo disconnects. 4 Properly power down and power up the controller and demonstrate basic fault recovery.

<p>Robotics Overview</p> <p>3 Research the historical use of robotics from textbooks, news media, and other informational texts. Create a presentation concerning the various uses of robotics. For example, explore areas such as the surgical field, space exploration, agriculture, and advanced manufacturing. (TN Reading 1, 2, 4, 7; TN Writing 4, 7)</p> <p>4 Write a persuasive essay explaining why robots should be used in certain circumstances. Cite textual evidence to support claims (for example, assemble evidence from medical journals to support a claim that the use of robots has lowered costs and increased efficiency among medical providers). Other examples may derive from the areas identified in standard 3. During a class discussion, defend original arguments and debate peer perspectives using claim(s) and counterclaim(s) developed in the persuasive essay. (TN Reading 1, 4, 7, 8; TN Writing 1, 4, 7, 9)</p>	<p>Robotics Overview</p> <p>5 Understand and research the history of robotics and their uses in our world. Assignments could be papers, presentations, and/or group discussion.</p>
<p>Career Exploration</p> <p>5 Create a presentation illustrating industries, organizations, and careers in Tennessee and other states that use robotics (such as Nissan in Automotive Manufacturing). Include work activities involved, postsecondary education needed, and skills necessary for these careers. (These could range from industry certifications to degrees in robotics engineering.) (TN Reading 2, 4; TN Writing 2, 4, 7, 8)</p> <p>6 Research the ethical considerations involved in developing new and modifying existing technologies. For example, investigate the National Society of Professional Engineers' (NSPE) Code of Ethics for Engineers or the Computer Ethics Institute's Ten Commandments of Computer Ethics. Select an existing technology and describe the ethical dilemmas faced by both producers and consumers of that technology, such as trade-offs between individual versus societal benefits or unforeseen consequences to the environment. For example, examine why some workers and labor unions may view robots as a threat to their jobs. Present findings to the class in a format appropriate for a career and technical student organization (CTSO) event. (TN Reading 2, 4, 7; TN Writing 2, 4, 7, 9)</p>	<p>Career Exploration</p> <p>6 Understand and research the industries and careers in the state of TN for robotics. Assignments could be papers, presentations, and/or group discussion.</p> <p>7 Research the ethics and social effects on today's workforce due to the advancement of robotic field. Assignments could be papers, presentations, and/or group discussion.</p>
<p>Programming</p> <p>7 Create a flowchart of a program for a robotic system. Convert the flowchart into a working program. Test, modify, and optimize the program. Write a technical report evaluating the performance of the program. Support all claims with specific examples. (TN Reading 3, 4; TN Writing 1, 4)</p>	<p>Programming</p> <p>8 Programming using the OEM robot of choice (Fanuc, Moto-man, or ABB)</p> <ul style="list-style-type: none"> Control positions (base, tool, or joint coordinate systems with multiple axes systems)

<p>8 Log, store, and export data received from two or more sensors (for example, vision/light, audio, and touch) in a robotic or automated system. Explain why these procedures would be useful and provide specific examples. (TN Reading 3, 4; TN Writing 4)</p>	<ul style="list-style-type: none"> • Configure I/O, system variables and perform setup • Label programs • Configure style table • Identify function of the robot, teach pendant or controller • Save, restore, and back up Download and upload software • Understand interpolation operation of robot (linear, circular, joint, speed, accuracy, etc.) • Define robot motion attributes (speed, accuracy to destination, interpolation) • Perform robot mastering at Zero position and single axis • Perform robot calibration and Test Robot for proper master and calibration • Properly verify and or define Tool Center Point (TCP) • Set up or verify Software Limits, issues relating to new software limit setting program • Understand Program for style options • Program/modify function conditions • Create and Run Program for an industrial application using training robot • Locate robot inputs and Outputs screen to determine status of system or equipment
<p>Engineering Design and Science & Engineering Practices</p> <p>9 Compare and contrast the following engineering design process with the eight practices of science and engineering (Achieve, 2013). Based on observations, write a brief paper explaining how the engineering design process and the science and engineering practices overlap, and describe how they might be used in automated systems design. Present findings to the class and refine the paper based on feedback. (TN Reading 2; TN Writing 2, 5)</p>	<p>Engineering Design and Science & Engineering Practices</p> <p>9 Understand and research the engineering design process for the field robotics. Assignments could be papers, presentations, and/or group discussion.</p>

Engineering Design Process	Science and Engineering Practices
a) Identify the problem	a) Asking questions (for science) and defining problems (for engineering)
b) Identify criteria and specify constraints	b) Developing and using models
c) Brainstorm possible solutions	c) Planning and carrying out investigations
d) Research and generate ideas	d) Analyzing and interpreting data
e) Explore alternative solutions	e) Using mathematics and computational thinking
f) Select an approach	f) Constructing explanations (for science)

	and designing solutions (for engineering)
g) Write a design proposal	g) Engaging in argument from evidence
h) Develop a model or prototype	h) Obtaining, evaluating, and communicating information
i) Test and evaluate	
j) Refine and improve	
k) Create or make a product	
l) Communicate results	

Computers and Electronics

10 Create an explanatory presentation that describes the parts necessary to make a robot and distinguishes it from a computer and a non-robotic machine. Parts necessary to make a robot include: (1) having a microprocessor for a brain, (2) sensors for input and output, (3) controls, and (4) motors. The presentation should include an informative report that describes various types of sensors (for example, auditory, visual, heat, etc.) and a summary of how sensors provide input. It should also describe various types of output (for example, motors, mechanisms, speakers, light, etc.) and discuss how sensors provide output. (TN Writing 2, 4, 9)

11 Design, develop, and test a program to control a robotic system and robotic subsystems. The program should be able to receive data from a robot's input devices, process the data, and create outputs based on the inputs received. Present the robotic system to the class and provide details on the methodology used to design and develop the program, justifying selections as appropriate. (TN Writing 4, 5)

12 Utilize feedback loops in a robotic system. For example, create a demonstration

Computers and Electronics

****LEAP Outcome 8)** would meet the requirements for STEM standards 10, 11, & 12

<p>scenario and program a robot that requires the following: start, stop, or change motion within a robotic or automated system based on sensor input, provided by two or more sensors (such as vision/light, audio, and touch). (TN Reading 3, 4; TN Writing 4, 5)</p>	
<p>Mechanics</p> <p>13 Use mechanical tools, such as motors, gears, and gear trains in the construction of a robotic or automated system. Identify where forces are acting upon various points on the system and document with simple diagrams. Use the concepts of force, torque, and mechanical advantage to calculate the force acting upon the points in the system. (TN Reading 3, 7; TN Writing 4; TN Math N-Q, A-REI)</p> <p>14 Develop a system to demonstrate force, torque, work, and power acting upon or being done by a robotic or automated system. Justify the design by creating mathematical models that show the calculations. (TN Reading 3; TN Writing 4; TN Math N-Q, A-REI)</p>	<p>Mechanics</p> <p>10 Study the mechanics and mathematical principles used in a robotic system (speed, torque, force, etc.)</p>
<p>Testing, Maintenance, Documentation, and Quality Assurance</p> <p>15 Use appropriate instruments to measure and record electrical, light, and audio outputs of a robotic system. Compare measured data to acceptable norms for the system. Document whether the system is performing within accepted parameters and cite evidence to support the claims. Perform maintenance or follow recommended procedures to correct malfunctions or underperformance within the system. Write a justification for any maintenance that is performed, citing data obtained from test results. (TN Reading 3, 4; TN Writing 1, 4)</p> <p>16 Create a service and maintenance report on a robotic or automated system. The report should include text explaining the maintenance and corrective measures conducted. It should also include text justifying whether the system is functioning properly or recommending additional measures to correct any issues within the system. Finally, it should include text recommending quality-assurance policies and procedures to assure continuing operation of the system within acceptable parameters and text describing corrective procedures to be used when the system is malfunctioning or operating below optimal performance. (TN Reading 5; TN Writing 1, 2, 4, 5)</p>	<p>Testing, Maintenance, Documentation, and Quality Assurance</p> <p>11 Perform adjustments on the robot and diagnose robot mechanical problems to the component level.</p> <p>12 Create a preventative maintenance plan based on OEM technical documentation</p> <p>13 Perform a preventative maintenance task on the robotic unit</p>

<p>Projects</p> <p>17 Working in a team, design and create a robotic solution to a given problem. Incorporate the engineering design process, as well as science and engineering practices, to develop a solution that meets the criteria for entries in a regional, state, or national robotics competition. Maintain an engineering notebook to document the details of the project. Write a technical paper (see components of the report below) and develop a presentation describing the solution and development process for the team solution. The technical paper should include, but is not limited to:</p> <ul style="list-style-type: none"> a) Background b) Problem definition c) Design constraints d) Methodology e) Data analysis (e.g., charts, graphs, calculations) f) Results/Problem solution (include engineering drawings) g) Conclusions and recommendations for future research <p>(TN Reading 1, 3, 4, 7, 9; TN Writing 2, 5, 6, 7, 8, 9)</p>	<p>Projects</p> <p>14 Working in a team, design and create a robotic solution to a given problem using the robot trainer</p>
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MOTLOW STATE COMMUNITY COLLEGE

Office of the President

July 19, 2016

Tennessee Higher Education Commission
Attn: Curt Johnson
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830


To Whom It May Concern:

Motlow State Community College is pleased to partner with seven county high schools and two workforce development areas to provide more opportunities for work-based learning. This partnership will enable us to purchase robotics equipment and train high school teachers in all seven counties to deliver these STEM courses in robotics. Beginning with some dual credit courses, we will start students on a pathway eventually leading to a certificate and an Associate of Applied Science degree in Advanced Manufacturing Technology. This grant will be the first step of the process.

Motlow State Community College's McMinnville Campus is an integral part of this community, preparing students to be productive members of our society and contribute positively to the economy. To meet this challenge, we must recruit and retain students in work-based learning opportunities such as advanced robotics. We have proven success in doing these types of programs. The first Mechatronics program in Tennessee was developed here by the very same group of dedicated and motivated individuals. This program has proven highly successful with over 300 students now contributing to the economy working in the Mechatronics industry. We are now ready to take the next step into advanced robotics. We have expanded the program to several area high schools, and it is thriving in each of them. This group is driven and committed to success in economic development. Several area employers are committing to internships and jobs due to our previous success.

The initiative is important because skilled, educated talent is the key to this region's economic success. I am grateful for the funding opportunity the Tennessee Higher Education Commission is providing with this grant, and I am confident this team will be highly successful in achieving the goals when they are awarded the funding they have requested.

Sincerely,


Dr. Tony Kinkel
President
Motlow State Community College



Cannon County Schools

301 West Main Street Woodbury, TN 37190

Barbara N. Parker – Director of Schools

Ph: (615) 563-5752 Fax: (615) 563-2716

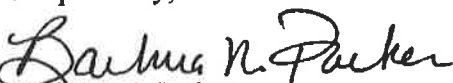
July 22, 2016

Commissioner Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Johnston:

This letter confirms the full support of Cannon County School System regarding the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to work with our business community in an ongoing effort to bring advanced robotic training to Cannon County. The Cannon County School System commits to providing space, facilities, maintenance and educator(s) for training on the robotics. The demand among our students for this type of training is great; this would be a new endeavor for Cannon County. Participation in this program will provide us robotics training equipment which will allow us to serve an additional 20 students each year. We are very excited to begin our relationship with Motlow State Community College, as well as work collaboratively with other counties in our region. Thank you for this opportunity. Please contact me if you need additional information.

Respectfully,


Barbara N. Parker
Director of Schools



COFFEE COUNTY BOARD OF EDUCATION

Dr. LaDonna McFall, Director of Schools

1343 McArthur Street

Manchester, Tennessee 37355

Telephone - 931-723-5150 Facsimile - 931-723-8285

July 20, 2016

RE: LEAP Grant for Motlow State Community College-McMinnville TN Campus

As the Director of Coffee County Schools, I am writing this letter for support of the LEAP Grant Application for Motlow-McMinnville TN for funding of a robotics class at our Coffee County Central High School.

Coffee County Central High School has several students who participate in our CTE (Career and Technical Education) programs and would benefit from a robotics class. As a county, the Industrial Board of Coffee County has shown us the need for skilled labor in our county. Having this grant will provide our students with the skills to succeed in the industry.

Your consideration for Coffee County Schools to be part of the LEAP Grant Application for Motlow-McMinnville TN, would be greatly appreciated. Please do not hesitate to contact me if I can provide further assistance.

Sincerely,

Dr. LaDonna McFall, Director
Coffee County Schools



DeKalb County Board of Education

Wiring students to learn, achieve, and succeed

Patrick Cripps
Director of Schools

Board Members
W.J. "Dub" Evins, Chairman
Doug Stephens, Vice Chairman
Jim Beshearse
Jerry Wayne Johnson
Kate Miller
Danny Parkerson
Shaun Tubbs

July 18, 2016

Motlow State Community College
McMinnville Campus
225 Cadillac Lane
McMinnville, TN 37110

Dear Sir:

This letter is in support of the LEAP grant application that Motlow Community College, is submitting for Robotics.

DeKalb County Board of Education strongly supports the proposed project which will result in an expansion of a successful training program for DeKalb County High School students. We will provide space for equipment and sustain the program. Also, we will provide an instructor to teach the training.

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick Cripps", is written over a horizontal line.

Patrick Cripps
Director of Schools



GRUNDY COUNTY BOARD OF EDUCATION

Mrs. Jessie Kinsey, Director of Schools

1376 Main Street
PO Box 97
ALTAMONT, TENNESSEE 37301

Telephone: (931) 692-3467
Facsimile: (931) 692-2188

July 25, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Mr. Johnston:

This letter confirms the full support of Grundy County School District regarding the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to work with our business community in an ongoing effort to bring advanced robotic training to Grundy County. The Grundy County School District commits to providing space, facilities, maintenance and educator(s) for training on the robotics.

We are very excited to begin our relationship with Motlow State Community College, as well as work collaboratively with other counties in our region.

Thank you for this opportunity. Please contact me if you need additional information.

Respectfully submitted,

Jessie Kinsey
Grundy County Director of Schools

**Van Buren County
Board of Education**

Cheryl Cole
Director of Schools



293 Sparta Street • P.O. Box 98
Spencer, Tennessee 38585
(931) 946-2242
Fax: (931) 946-2858

July 20, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

This letter confirms the full support of Van Buren County School System regarding the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to work with our extended business community in an ongoing effort to bring advanced robotic training to Van Buren County. The Van Buren County School System commits to providing space, facilities, maintenance, and educator for training on the robotics. The demand among our students for this type of training is great! Participation in this program will provide us robotics training equipment which will allow us to serve up to 20 students each year. Van Buren County School System has never been able to offer a program like this one. We are very excited to expand our relationship with Motlow State Community College, as well as work collaboratively with other counties in our region. Thank you for this opportunity. Please contact me if you need additional information.

Respectfully,

A handwritten signature in cursive script that reads "Cheryl Cole". The ink is dark and the signature is fluid.

Cheryl Cole
Van Buren County
Director of Schools

Supervisor of Instruction
Glenn Cole
Supervisor of Attendance
Billie J. Grissom

Supervisor of Nutrition
Beth Oakes
Supervisor of Special Education
Virginia Baker

Director of Special Projects
Phyllis Sullivan
Technology Coordinator
Chris Hargrove



**Warren County Board of Education
Administrative Offices
2548 Morrison Street
McMinnville, Tennessee 37110**

**John R. (Bobby) Cox, Ed. S.
Director of Schools**

**Telephone: (931) 668-4022
Fax: (931) 815-2685**


July 11, 2016

Megan Farris
Economic Development Planner
Upper Cumberland Development District
1225 S. Willow Ave.
Cookeville, TN 38506

Dear Ms. Farris:

This letter is to confirm the full support of the Warren County School District regarding the Advanced Robotics Training (ART) grant in development for a LEAP grant application. We are happy to work with our business community in an ongoing and sustained effort to bring advanced robotic training to the Warren County School District and can commit space and facilities for an advanced robotics training lab in our high school as well as any ongoing maintenance of any equipment. We are very excited to work in collaboration with the other counties in our region as well as continuing our relationship with Motlow State Community College. If you need any other information from us, please do not hesitate to contact me and thank you for this wonderful opportunity.

Respectfully,


John R. Cox
Director of Schools

One Team, One Goal, High Levels of Learning for All



White County Board of Education

Kurt Dronebarger
Director

136 Baker St.
Sparta, TN 38583
Phone: 931.836.2229
Fax: 931.836.8128

7.15.16

Dear Industry Leader,

The White County Board of Education is committed to educating a workforce that is prepared for the jobs in your industry. We have made significant investment in the past several years to provide the facilities, teachers and the equipment necessary to meet the demands of our community employers. We have researched the growing job market and have developed programs of study to fill the needs of area businesses. We are in touch, in-line and involved with what you do and we want to enhance that partnership.

White County has applied for a LEAP Grant with several other school systems in the Upper Cumberland to provide funding for a robotics program in our schools. We are currently meeting the program needs of students in the areas of Nursing, Agriculture, Auto Mechanics, Welding, Mechatronics and more! This new grant will allow us to meet the growing need for robotics training in our region. Currently, employers using robotics must send their employees out of state for several weeks to receive this training. This new program will allow us to create a local pipeline of trained employees and greatly reduce the training costs for employers. That's a win/win!

Our system has recently doubled the size of our Career and Technical Education facilities. Our new White County Career Academy will house many of the afore mentioned programs and will open this fall. We would invite you to visit and tour the facility at your convenience. We will be providing the facility, instructors and materials. We will own and operate the machinery. We will provide the best, local training available. We will also provide robotics interns to work in your business through our work based learning program. Our promise is to grow the program into the future that will include providing evening classes for adults. We simply need your support.

White County and the coalition of Upper Cumberland schools would like to partner with you in this endeavor. Please respond if you have questions or would just like to know more about this opportunity. We appreciate your time and attention to this matter and I look forward to hearing from you soon.

Sincerely,



Kurt Dronebarger
Director of Schools



B A T E S V I L L E M A N U F A C T U R I N G , I N C .

Manchester Operations • 175 Monogard Drive • Manchester, Tennessee 37355

7/20/16

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Mr. Johnston:

We are writing to express our interest in and support of the Advanced Robotics Training (ART) program in relation to the regional LEAP 2.0 2016 (Labor Education Alignment Program) grant application. Batesville, Manufacturing Inc. believes in investing in our future generations to preserve our industry while supporting our local community and workforce. We would be interested in having 0 - 4 interns and 2 - 4 co-op students by August of 2018 from this program at our plant through work based learning programs at the high school. We would also commit to hiring Motlow State Community College graduates from the robotics program in the future as needed.

Batesville Manufacturing, Inc. believes this project will have a positive impact on our local workforce, community, and region. We also believe this is a perfect example of a regional partnership for robotic training program for individuals to "earn as they learn" and prepare for tomorrow's workforce. The regional partnership will include the following counties: Cannon, Coffee, DeKalb, Grundy, Van Buren, Warren and White.

Respectfully submitted,

Corey Warden
Interim HR Manager



**Bridgestone Americas
Tire Operations**
725 Bridgestone Drive
Morrison, TN 37357

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

I am writing this letter to formally show Bridgestone's support of an Advanced Robotics Training program for Warren County. This program would be a tremendous benefit to our manufacturing plant, which employs 1,096 Bridgestone teammates and contractors from Warren and surrounding counties.

Our Engineering Department consists of mechanical and electrical engineers, as well as 80 engineering technicians who are our first-line troubleshooters on the factory floor. We depend on these teammates having the skills necessary to properly install, set up, maintain, and repair our production equipment.

One of the fields that is growing rapidly in our industry is robotics. Most of our technicians learn "on-the-job" from other technicians or from robot supplier technicians. Having locally trained talent who have the skills to program, troubleshoot, and maintain these robotic systems would be a great benefit to our company.

Bridgestone currently employs two to four co-op students for our EE and ME disciplines, as well as students pursuing their AS degrees in Mechatronics. With the addition of an ART program locally, we would certainly pursue hiring one or two interns/co-op students each year from this discipline. Our hiring of full time technicians is based upon needs. Certainly, any candidate who possesses skills with robotics will have an advantage over other candidates, all other things being equal.

There is another benefit to having an ART program near our plant. We could send our current technicians to robotics training locally rather than sending them out of town. This would make the training more accessible, thereby making it easier on the teammate, and saving money otherwise spent on out-of-town travel.

An ART lab in McMinnville simply makes good business sense. Please let me know if you would like more information regarding Bridgestone's support of this initiative.

Sincerely,

A handwritten signature in cursive script that reads "John Stewart".

John Stewart
Plant Manager
Bridgestone Americas Tire Operations
Warren County Plant
stewartjohn@bfusa.com



**Bridgestone Americas
Tire Operations**
1201 Bridgestone Parkway
La Vergne TN 37086

July 21, 2016

Dear Mr. Todd Herzog:

As a good corporate business partner and citizen, Bridgestone values the investment in education and community support. It is one of our company's pillars in our mission statement.

Please find enclosed our commitment to support the ART Program as we previously discussed. We intend to support the opportunity for interns that complete this program along with our other business partners. We can accommodate one student/intern per semester if available. This also allows us the ability to assess the intern for future hiring potential if positions are available.

Sincerely,

A handwritten signature in dark ink, appearing to read "Sean Kelley".

Sean Kelley
LaVergne Plant Manager
Bridgestone LaVergne Plant
615-287-7520
kellysean@bfusa.com



July 22, 2016

Commissioner Curt Johnston

Dear Commissioner Johnston,

We are writing to express our interest in and support of the Advanced Robotics Training (ART) program in relation to the regional LEAP grant application. At CalsonicKansei we believe in investing in our future generations to preserve our industry while supporting our local community and workforce.

CalsonicKansei employees over 2,500 team members in the Middle Tennessee area and our organization utilizes a variety of robotic equipment. A proven curriculum in ART would greatly benefit our team member's careers (present and future), improve the gap in a STEM related field and continue to bolster Tennessee as a leader in the automotive manufacturing sector.

We believe this project will have a positive impact on our local workforce, community, and region. We appreciate the opportunity to be a part of this innovative collaboration. Please feel free to contact me if you need further information.

Respectfully,

A handwritten signature in dark ink, appearing to read "Nancy Rice", is written over a light blue horizontal line.

Nancy Rice

Vice President Human Resources



Custom Tool Inc.
PO Box 3633
Cookeville, TN 38502
www.customtoolinc.com

July 15, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

RE: White County High School and the Robotics Associate's Degree Program at Motlow

Dear Review Committee Members:

Custom Tool, Inc. is pleased to hear White County High School and Motlow State Community College are developing plans to offer training in robotics at the high school level. The utilization of robots in manufacturing, as well as other applications, has increased exponentially in the U.S. over the past ten years. Establishing a program to introduce this technology to students at the high school level, with the option for them to continue that training at a community college level is a wise, forward thinking plan.

As an employer who commissioned its' first robotic cell in May of 2015, we know the role robotics play in manufacturing will continue to grow. Our current business plan includes bringing additional robotic cells online over the next five years. A pipeline of talent capable of filling the employment positions we expect to create will be key to our success.

For the past five years, Custom Tool has provided internships and part-time employment opportunities to students enrolled in a technical field of study. Thirty percent of our current employees were through our internship program. We are confident our program could be expanded to include those enrolled in this program of study at both the high school and community college level.

Robotics training at White County High School, with continued training at Motlow Community College will be significant to both students and employers in the Upper Cumberland. Your approval of this grant application will be very much appreciated.

Sincerely,

Robert L. Young
Vice President



**FEDERAL-MOGUL
MOTORPARTS**

July 25, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

We are writing to express our interest in and support of the Advanced Robotics Training (ART) program in relation to the regional LEAP grant application. Federal-Mogul believes in investing in our future generations to preserve our industry while supporting our local community and workforce. We would be interested in having 2 interns and 2 co-op students per school year from this program at our plant through work based learning programs at the high school. We would also commit to hiring Motlow State Community College graduates from the robotics program in the future if openings were available and they were the most qualified candidates, following the normal interview and selection process.

Federal-Mogul believes this project will have a positive impact on our local workforce, community, and region. We appreciate the opportunity to be a part of this innovative collaboration. Please feel free to contact me if you need further information.

Respectfully,

JT Smith
HR Manager
Federal-Mogul
615-597-3620

**Lighting Products
325 Sewell Road
Sparta, TN 38583
931 738-2261**



July 18, 2016

**Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830**

Dear Mr. Deaton:

On behalf of White County High School, I would like to ask for your approval of a grant to help fund a robotics program that will feed high school students into the robotics associate's degree program at Motlow State Community College.

My organization currently employs an experienced workforce with our hourly production employee averaging 57 years old and has on average 31 years of work experience. While that is a great problem for me to have at this moment; the reality is that I am going to have to replace these employees in the near future with a lot of the workforce retiring within the next five years.

While we could utilize some of the internal resources that are available to us to train replacements, we would like to have the option of having a new perspective, new idea that comes straight from the classroom. We encourage new ideas, easier methods, and increased productivity in our processes at all times. Currently there are some robotics in place here and we only expect to have more in the future. We would like to have a skilled workforce available to help us as business demands increase that can be provided by this program.

If this program is put into place we would certainly work with White County High School to make sure that it is successful. In addition, we would look at internships at the college level and would consider any degreed applicants for job openings that we might also have for positions in robotics.

Thank you for consideration of this request. Should you have any questions, please feel free to contact me at (931) 738-2261 or (931) 738-4263.

Sincerely,

A handwritten signature in dark ink, appearing to read "Gary D. Hall", written over a horizontal line.

Gary D. Hall

Human Resources Manager



Great Lakes Cheese Co., Inc.

17825 Great Lakes Parkway P.O.Box 1806 Hiram, OH 44234-1806 440-834-2500 Fax 440-834-1002

July 21, 2016

TO WHOM IT MAY CONCERN:

RE: Labor Education Alignment Program (LEAP) 2.0 Grant

I am writing this letter in support for the LEAP Grant application to establish and implement an Industrial Maintenance program in Coffee County. This program will address the current skills gap in our area and provide us with more technically trained workers.

In addition, we are committed to support the work-based learning component in the LEAP Grant by hiring and paying enrolled students to provide them with on the job training as they continue their education.

Thank you for your consideration for the LEAP Grant to assist and serve industries in Coffee, Warren, Bedford and Grundy Counties.

Sincerely,

Bill Merrick
Plant Manager

Kasai

Kasai North America, Inc. • 1020 Volunteer Parkway • Manchester, Tennessee 37355 • (931) 728-4122

Date 7/20/16

Kasai North America (formerly M-Tek) Jack Foy
1020 Volunteer Pkwy
Manchester, TN 37355

Subject: Response on ART Program

Dear Mr. Todd Hertzog

1. Our company supports the ART program
2. Yes, we are interested in one intern.
3. Yes, we are interested in one co-op at 20 hours per week paid.
4. Yes, we are interested in hiring AS in the ARTS program. Possibly one or more per year.
- 5.

Regards,

Jack Foy
Kasai North America
GM Maintenance & Tooling

Kasai North America, Inc.
Manchester Plant



MORRISON INDUSTRIES

To Whom It May Concern:

We are writing to express our interest and support in the ART program. Morrison Industries believes greatly in investing in the future generation to preserve our industry while supporting our local community. We would be interested in having two interns and four co-op students at our plant. We would be interested in hiring two to four Motlow graduates in the future. We would consider any assistance from the program on special projects and any other way we can help.

Sincerely,

Jacob J. Wilson
President
Morrison Industries

P 931.668.7909
F 931.668.3750

211 PROGRESS BLVD
MORRISON, TN 37357

WWW.MORRISONINDUSTRIES.COM

7/25/2016

Ryan Hargis
Nissan North America
520 Nissan Powertrain Drive
Decherd TN, 37324

Dear Mr Herzog,

As you are well aware of the Industrial Maintenance Community is continually searching for skilled, well trained individuals to support the ever growing demand of the manufacturing industry. The development and maintenance of these systems require specific in depth training in the areas of automation and robotics programing. I believe ART program has a lot to offer in regards to the training of current and future Multi-craft industrial maintenance technicians.

I believe we could support an internship of 2-3 ART program students here at our Decherd facility where they could possibly work along side or multi-craft industrial maintenance journeyman technicians. Although I can not rule out the possibility of including co-op students; however at this time I do not think we are in a position to hire any in a part time or full time basis.

In regards to hiring Motlow ART program graduates I feel that the ART program will cover a good portion of the training our perspective technicians will need. ART graduates who also have a received solid industrial maintenance training course would surely be a huge part or our future maintenance technician work force.

I truly appreciate your efforts with the pursuit of this development and am excited with the prospect of having this type of advanced training come to our area.

Sincerely

Ryan Hargis

Nissan North America

Maintenance Manager – Infinity Powertrain Maintenance Department

ryan.hargis@nmm.nissan-usa.com



SHIROKI North America, Inc.

1111 West Broad Street, Smithville, Tennessee 37166 • Tel: (615) 597-8870 • Fax: (615) 597-8876

July 20, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

We are writing to you to express our interest in and support of the Advanced Robotic Training (ART) program in relation to the regional LEAP grant application. Shiroki North America has an ever increasing need for a highly skilled work force. We certainly have a need for a workforce that is trained in robotics as our use of robots in our processes continues to increase. We would potentially have a need for up to five co-op students per year. We would also potentially have a need for up to three Motlow State Community College graduates from the robotics program in the future.

Shiroki North America fully supports this program and looks forward to the positive impact that this program will, no doubt, have on our local workforce and community as a whole. Please feel free to contact me if you need further information.

Best Regards,

Bob Young

Plant Manager-Smithville Plant



July 18, 2016

Dear ART Task Force:

Yorozu Automotive is highly supportive of the prospect of a Robotics Technology program being implemented in the Middle Tennessee Area. Yorozu Automotive is a large user of robots with over 1200 units already installed in our Morrison, Tennessee location. It has always been difficult for us to hire new employees with robotic experience and we feel that an ART program at Motlow will address a strong need for our company as well as other companies in this area.

Yorozu Automotive would be highly interested in hiring Interns, Coop Students and also Graduates from a local ART program. I would estimate that once an ART program is established, Yorozu would hire several candidates from this program every year, but the exact number would depend entirely on our business situation. Currently, we are aggressively hiring new employees and we could easily hire 20+ ART candidates if they were available today.

Yorozu Automotive would be a long term supporter of an ART program as well. We would strive for continuous improvement of the program by offering our advice based upon our experience and our technology. It will be very important for the ART program to keep current with advancements in technology as well as the needs of local companies in the Middle Tennessee Area.

It is the sincere hope of Yorozu that a ART program can be established in the Middle Tennessee Area and we look forward to being a good partner with that program.

Thank you,

A handwritten signature in black ink, appearing to read "Bruce Hutchins".

Bruce Hutchins
Senior Manager of Engineering
Yorozu Automotive Tennessee

YOROZU AUTOMOTIVE TENNESSEE, INC

395 MT. VIEW INDUSTRIAL DRIVE • MORRISON, TENNESSEE 37357 • (931) 668-7700 FAX (931) 668-7777



To: Whom It May Concern

From: Keith R. Hayes

Date: July 22, 2016

Subject: High Interest in ART Program

VIAM Mfg. Inc. has a strong interest in the ART program. VIAM uses approximately 36 robots in our day to day operations. The expertise in the robotics field is one we find ourselves recruiting on a national level due to the inability to find these skills locally. VIAM has a strong interest in participating in this program on an intern basis or a co-op basis. We for certainly are interested in hiring students whom graduate with this degree from Motlow.

Sincerely,

A handwritten signature in cursive script that reads "Keith R. Hayes".

Keith R. Hayes COO



MIKE GANNON
County Executive of Cannon County

200 W. Main St. • Woodbury, TN 37190 • 615-563-2320 • Fax: 615-563-2319 • Email: cannonex@dtccom.net

July 21, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

I am writing on behalf of Cannon County to express our support of the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to be part of a collaborative effort between Motlow State Community College, multiple high schools spanning two regions and two workforce development areas, and local and regional industries to expand training in robotics and the implementation of this technology in our region.

On behalf of Cannon County, I would like to thank you for the opportunity to create this program that will prepare our students and our businesses for the future. Please contact me if you need additional information.

Yours Truly,

Mike Gannon
Cannon County Executive

County Mayor of Coffee County

GARY CORDELL

1329 McArthur Street
Suite 1
Manchester, TN 37355



931-723-5100
Fax 931-723-5152
Email: mayor@coffeecountytn.org

July 20, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

RE: LEAP Grant for Motlow State Community College-McMinnville TN Campus

As the Mayor of Coffee County, TN, I would like to express my strong support for the LEAP Grant Application for Motlow-McMinnville TN which would include funding for a robotics class at Coffee County Central High School in Manchester, Tennessee.

We've seen first-hand, through the Industrial Board of Coffee County, the tremendous need for skilled labor in our area. Businesses looking to relocate to Middle Tennessee are passing us by because we aren't able to provide them with the number of skilled employees they need. Having this Grant will not only provide our young people with an opportunity to learn key occupational skills but also provide existing and new businesses with skilled employees who are trained and ready to work.

I urge you to give serious consideration to the approval of the LEAP Grant Application for Motlow-McMinnville TN. If I can be of any assistance or provide you with any information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Gary Cordell". The signature is fluid and cursive, with the first name "Gary" being more prominent than the last name "Cordell".

Gary Cordell
Coffee County Mayor



DeKalb County Mayor
TIM STRIBLING


July 20, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

I am writing on behalf of Dekalb County to express our support of the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to be part of a collaborative effort between Motlow State Community College, multiple high schools spanning two regions and two workforce development areas, and local and regional industries to expand training in robotics and the implementation of this technology in our region. On behalf of Dekalb County, I would like to thank you for the opportunity to create this program that will prepare our students and our businesses for the future. Please contact me if you need additional information.

Respectfully,


Tim Stribling
DeKalb County Mayor



GRUNDY COUNTY MAYOR

Michael Brady, County Mayor

P.O. Box 177

Altamont, TN 37301

(931)692-3718

(931)692-3721 - fax

July 21, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Mr. Johnston:

As County Mayor of Grundy County, I wish to express my total support of the Advanced Robotics Training (ART) program proposed in the LEAP 2.0 2016 (Labor Education Alignment Program) grant application. Our county is excited to be part of this regional effort to provide training to high school students in this seven county area including, Cannon, Coffee, DeKalb, Grundy, Van Buren, Warren and White. This project is being driven by the employers in this region, expressing the lack of training in this workforce area.

On behalf of Grundy County, I would like to thank you for the opportunity to be a part of this program that would prepare our students and our businesses for the future.

Respectfully submitted,

Michael Brady
Grundy County Mayor



101 East Main Street
P. O. Box 7088
McMinnville, TN 37111
Tel: 931.473.1200
Fax: 931.473.1202
www.mcminnvilletn.com

July 20, 2016

As Mayor of McMinnville, I would like to express my support of the Advanced Robotic Training project proposed in the LEAP Grant application.

Rural Tennessee Communities are faced with many challenges, but this work-based initiative will help address the shortage of skilled labor in our multi-county region and build new jobs.

The success of the fully-integrated Mechatronics program at Warren County High School, which allows of an Associate's Degree to be earned at Motlow State Community College, has given us a local base to grow similar classes in other surrounding school systems. The implementation of this regional-work force development program will have a positive impact on the economy and accelerate job training at local industries. It allows the schools to partner with the business community to promote training and licensure. This is an exciting opportunity that will change the course of our future.

Preparing the students of today for the jobs of tomorrow will allow us to invest where the grant dollars will have the most impact. Through this cooperative partnership, we will be investing in the type of technology needed in today's 21st Century economy.

With teamwork...we can build a better tomorrow.

Sincerely:





Greg B. Wilson Van Buren County Mayor
P.O. Box 217
Spencer, TN 385

Phone (931)-946-2314
e-mail- mayorgwilson@outlook.com

July 20, 2016

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton:

I am writing on behalf of Van Buren County to express our support of the Advanced Robotics Training (ART) program proposed in the LEAP grant application. We are thrilled to be part of a collaborative effort between Motlow State Community College, multiple high schools spanning two regions and two workforce development areas, and local and regional industries to expand training in robotics and the implementation of this technology in our region. On behalf of Van Buren County, I would like to thank you for the opportunity to create this program that will prepare our students and our businesses for the future. Please contact me if you need additional information.

Respectfully,

Greg Wilson
Van Buren County Mayor



WARREN COUNTY, TENNESSEE

201 Locust St., Suite 1 • McMinnville, Tennessee 37110

Phone (931) 473-2505 • Fax (931) 473-0635

County Executive
Herschel Wells

July 21, 2016

Commissioners

Terry Bell
Morris Bond
Carl D. Bouldin
Carl E. Bouldin
Teddy Boyd
Carlene Brown
Wayne Copeland
Randy England
Billy Earl Jones
Ron Lee
Gary Martin
Ken Martin
Michael Martin
Carolyn Miller
Charles Morgan
Gary Prater
David Rhea
Kenny Roberts
Scott Rubley
Tommy Savage
Diane Starkey
Blaine Wilcher
Shane Wilcher
Melissa Yancy

Commissioner Russ Deaton
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Commissioner Deaton,

As county executive of Warren County, I fully recognize the need to have a trained and ready workforce to meet the needs of manufacturing industries located throughout Warren County and the Upper Cumberland region. Demand for highly skilled applicants is rapidly increasing, reflecting significant and continued advancements in manufacturing processes and technology.

The Advanced Robotics Training (ART) program proposed in our LEAP grant application presents a win-win situation for all involved. Participants in the ART program will acquire state-of-the-art robotics training which will in turn allow industries to hire employees with the precise skills necessary for higher paying technical positions.

Creation of the ART program through receipt of the LEAP grant will have a lasting and positive impact on students, industries, and economies. There is a great deal of excitement in McMinnville and Warren County surrounding this proposal, and I am pleased to join with Motlow State Community College as well as local and regional high schools and industries in offering my support to the ART program. I respectfully request that our LEAP grant application be given serious consideration.

Thank you, and please feel free to contact me if you need additional information.

Sincerely,

Herschel Wells SR
chc

Herschel Wells, Sr.
Warren County Executive

HW/chc





July 20, 2016

Russ Deaton, Commissioner, Higher Education Commission

404 James Robertson Pkwy, Ste. 1900

Nashville, TN 37243-0830

Dear Commissioner Deaton:

Tennessee has been very successful in attracting manufacturing jobs. We wish to keep these representative industries happy with a continuous supply of qualified employees to support these locations.

Projections are for approximately 3.2 million advanced manufacturing jobs to be created across our great nation in the next ten years and not near enough qualified applicants to fill these industrial needs. Some research estimates that our pool of qualified applicants may be short by 2 million.

Locally, we have 7,000 robots currently in use within 75 miles of McMinnville, Tennessee. Yorozu, one of our local automotive industries, has over 1,850 robots in use with their processes, but there are no adequate training programs to maintain these investments anywhere close.

Advanced skills training is needed now. Evidence of this is punctuated by the interest shown by prominent industries in Warren and neighboring counties. Industry Representatives were in attendance at every meeting we had with the three most notable robot manufacturers in the world for preparation of this initiative.

So this letter of total support is easy to write, because the industries are demanding a trained qualified work force. We have listened and want to do our very best to train students for these challenging high-wage employment opportunities.

We totally endorse this project to bring advance robotic training to Middle Tennessee as evidenced by our initiation, participation and encouragement from the beginning.

Best regards,

A handwritten signature in blue ink, appearing to read "Don Alexander".

Don Alexander, Director



Gary D. Morgan
Executive Director

July 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Curt Johnston:

It is with much enthusiasm, *Workforce Solutions of LWDA 6* as the *Lead Entity* writes in support of LEAP 2.0 2016 Labor Education Alignment Program grant, Advanced Robotics Training (ART). The local collaborative has a strong partnership of seven rural counties from middle and east Tennessee: including Cannon, Coffee, DeKalb, Grundy, Van Buren, Warren and White counties. Employers, local government, school systems, business leaders, industry, chambers of commerce, industrial recruiters and community organizations met to create and endorse a regional grant application that prepares graduates for rapid entry into the industry sector workplace.

Dollars through LEAP 2.0 will enable the development and implementation of an employer-driven career pathway in a fully integrated advanced robotics curriculum for high school juniors and seniors and post-secondary studies at Motlow State Community College. Within a 75 mile radius of Warren County there are currently 7,000 industrial robots in use. Need for an even larger workforce pool is evident. This project will help address the widening skills gaps in the region, and through the initiative we will increase quality, high paying jobs for residents of our rural communities and support Governor Haslam's Drive to 55.

Realizing industry expansion and industrial growth will be accelerated because of a skilled workforce; LWDA 6 extends full support of the LEAP 2.0 grant application. We urge serious consideration of this regional plan.

Respectfully submitted,

Gary D. Morgan,
Executive Director

LWDA 6, Workforce Solutions

uchra

Upper Cumberland
Human Resource Agency

July 20, 2016

Curt Johnson
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Curt Johnson:

I am writing this letter in support of LEAP 2.0 2016 Labor Education Alignment Program grant, Advanced Robotics Training (ART). The local collaborative has a strong partnership of seven rural counties from middle and east Tennessee: including Cannon, Coffee, Dekalb, Grundy, Van Buren, Warren and White counties. Employers, local government, business leaders, school systems, community organizations, industry, industrial recruiters, chamber of commerce and community organizations met to create and endorse a regional grant application that prepares graduates for rapid entry into the industry sector workplace.

Funds through LEAP 2.0 will allow the implementation and development of an employer-driven career pathway in a fully integrated advanced robotics curriculum for high school juniors and seniors, as well as post-secondary studies at Motlow State Community College. Within a 75 mile radius of Warren County, there are currently 7,000 industrial robots in use. The need for an even larger workforce pool is evident. This project will help address the widening skills gap in the region. Through this initiative we will increase quality, high paying jobs for residents of our rural communities and support Governor Haslam's *Drive to 55*.

Recognizing that industry expansion and industrial growth will be accelerated because of a skilled workforce; LWDA 7 extends full support of the LEAP 2.0 grant application.

Best regards,



Ron Basham
Director of Employment and Training, LWDA 7

Delivering Hope

phone: 931.528.1127 ~ 580 South Jefferson Avenue, Suite B ~ Cookeville, Tennessee 38501-4010 ~ fax: 931.526.8305
TTY: 1.800.848.0298 ~ An Equal Opportunity Employer / Programs ~ web: www.uchra.com

**Chattanooga Area Regional Council of Governments
Southeast Tennessee Development District**

D. Gary Davis
Chairman

David Jackson
Secretary



Hoyt Firestone
Vice-Chairman

John Gentry
Treasurer

July 26, 2016

Mr. Curt Johnson
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, Tennessee 37243-0830

Re: LEAP – Advanced Robotics Training (ART) Program, UCDD

Dear Mr. Johnson:

This letter is written in support of the above referenced Labor Education Alignment Program Grant Application that will place robotics equipment in seven high schools throughout Local Workforce Development Area 6 including Grundy County. The placement of this equipment in these rural high schools will enable Motlow State Community College at McMinnville to introduce and better train high school students in advanced manufacturing and technology skill sets beginning the long overdue process of establishing curriculum and providing training to fill existing and expanding skill set gaps in this field.

The Southeast Tennessee Development District supports economic development efforts throughout our region and Grundy County is part of our region. Grundy County and other communities throughout the Upper Cumberland Development District remain economically distressed. It is imperative that these young people be trained for the advanced manufacturing jobs; i.e. robotics, that will enable them to secure employment in high paying, high demand jobs and that helps to develop a pipeline of qualified talent that will support industry recruitment and expansion.

The work of the ART Task Force has been truly collaborative spanning three development districts, two local workforce development areas, seven school districts and industry from across the region. There is tremendous need for training of this type of training throughout the region and this grant project will be major first step toward establishing curriculum and providing training to better meet the needs of business and industry while providing a sustainable, lucrative career path for many young people in the future.

Thank you in advance for your time and consideration of this LEAP application. I know that it will be afforded every possible consideration. We are excited to see this possibility extended to high schools throughout the Upper Cumberland Plateau including Grundy County. Please don't hesitate to contact me if I can be of any further assistance.

Sincerely,

Beth Jones
Executive Director

Cc: Honorable Michael Brady, Grundy County Mayor
Rick Layne, Director, WFDA 5



Upper Cumberland Development District

"Providing Solutions through Regional Cooperation"

June 25, 2016

Mr. Curt Johnson
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Dear Curt Johnson:

The Upper Cumberland Development District was established by TN State Legislature to support economic development in the Upper Cumberland Region, which includes the counties of Cannon, Clay, Cumberland, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, Van Buren, Warren, and White. The Development District provides support across many sectors including housing, aging, and economic development. The UCDD recognizes that the development of a skilled workforce is critical to the overall prosperity of the region.

The Development District is in full support of the Advanced Robotics Training (ART) Program seeking to be established through the LEAP application. This project is a true example of regional collaboration, spanning three development districts, two local workforce development areas, seven school districts and industries across the region. The work of the ART Task Force has been forward-thinking and industry-driven. There is tremendous need for training of this type in our region, and this grant project will begin the long overdue process of establishing curriculum and providing training to fill existing and expanding skill set gaps in this field in rural Tennessee.

Thank you for your time and consideration of our regional LEAP application. If you need additional information, please call me at 931.432.4111.

Sincerely,

Mark Farley
Executive Director